

REMARKS


Summary

Claims 1-21 are pending after entry of this amendment. Claims 22-24 have been added. No new matter has been added as a result of this amendment.

Rejection of Claims

Claims 1-21 received a rejection under 35 U.S.C. §103(a) as being unpatentable over Negishi et al. (U.S. Patent 5,907,314), in view of Ha (U.S. Patent 6,333,729) or Ino et al. (U.S. Patent 6,424,328). Applicant respectfully traverses this rejection, and submits that pending claims 1-21 are patentable over the references cited by the Examiner.

Claim 1 recites that a liquid crystal display with a switching unit to switch and allocate an image signal from each of the first and second source drivers to a predetermined number of source lines where the predetermined number of source lines is a number of lines less than the number of source lines within either of the two groups. This arrangement alleviates a problem for high definition liquid crystal displays by maintaining the ease of writing, which is dramatically decreased when the source driver allocates the image signal individually to each added source line.

 The Examiner states that Negishi is silent on the predetermined number of source lines being a number of lines less than the number of source lines within either of the two groups, but that Ha et al. and Ino et al. do teach this feature. Applicant, however, respectfully disagrees.

Ha discloses a liquid crystal display apparatus which includes MUX multiplexers, each of which is connected to output terminals LDs. Each of these MUX demultiplexers sequentially applies a video signal from the LD output terminals to four data lines DLi to DLi+3 by using the first to fourth selection signals SEL1 to SEL4, (Column 3, lines 42 – 50). Ha further discloses that four MOS transistors MN1 to MN4 included in the demultiplexer MUX are sequentially turned on at every horizontal scanning interval, thereby allowing the four data lines DLi to DLi+3 to be sequentially connected to the output terminal LDs.

Therefore, in Ha, all the data (source) lines are sequentially connected to the corresponding demultiplexer on every horizontal scanning interval, i.e. the image signal is allocated to all source lines on every horizontal scanning. In contrast to the

arrangement of claim 1 recites an image signal is switched and allocated from each of the first and second source drivers to a predetermined number of the source lines where the predetermined number of source lines is a number of lines less than the number of source lines within either of the two groups, i.e. the image signal is only allocated to a predetermined number of source lines on every horizontal scanning. Thus, this claim 1 arrangement alleviates a problem for high definition liquid crystal displays by maintaining the ease of writing, which is dramatically decreased when the source driver allocates the image signal sequentially and individually to each added source line.

In regard to Ino et al., this reference states that FIG. 8 is a configuration view showing a second example of the connections of a time-division switch section. This view shows the second example applied to a divided-by-three time-division driving corresponding to R, G, and B, and that a driver IC 14 time-sequentially outputs signal potentials for three R, G, and B pixels from output terminals through output lines 15-1, 15-2, 15-3, (Column 7, lines 56 – 62). Ino et al. further discloses that analog switches 66Rn, 66Gn, 66Bn, . . . are connected to the corresponding output ends of a driver IC 67 at the common connection points of the sets, and are turned on (closed) and off (open) in the order of R, G, and B by switch control pulses SL1, SL2, and SL3 output from a switch control circuit 68. Thus, the outputs of the driver IC 67 are divided and sent to three R, G, and B signal lines, such as the signal lines 62Rn, 62Gn, and 62Bn, while the analog switches 66R, 66G, 66B serve as time-division switches.

Therefore, in Ino et al., the driver time-sequentially outputs signal potentials for three pixels by turning on and off corresponding analog switches. In addition, the Examiner referred to Figure 15 as pointing out that Ino et al. teach that the predetermined number of source lines is less than a number of source lines within either of the two groups. However, Applicants submit that Figure 16, representing a diagram of the embodiment of Figure 15, indicates otherwise. In a discussion of Figure 16, Ino et al. states that image data input to the driver includes three pixel data arranged in series in 1H (i.e. one horizontal scan). The image data is sampled three times in 1H for the three pixel data, held in memory and outputted through a converter and an output circuit. The output is inverted in polarity every 1H, divided and sent to three signal lines by turning on (closed) and off (open) analog switches (time-division switches) by switch control pulses. Therefore, Ino et al. provide a

sequential sweep of a set of horizontal pixels in a single horizontal scanning period, i.e. $1H$, in contrast to the claimed arrangement of a claim 1 where only a predetermined number of source lines is provided with an image signal.

Claim 10 recites a method for applying the image signal to the source lines in a liquid crystal display that includes switching and allocating the image signal of each individual source driver to a predetermined number of source lines from one of the two groups of divided source lines in order to maintain the ease of writing in the liquid crystal display, where the predetermined number of source lines is a number of lines less than the number of source lines within either of the two groups. This method has a minimum effect on the ease of writing coefficient, thus solving the problem of added source lines to liquid crystal displays for high definition applications without substantially degrading the ease of writing.

As discussed above in regard to claim 1, the references, Negishi, Ha et al. and Ino et al., cited by Examiner do not show or suggest a switching of the image signal to a predetermined number of source lines, where the predetermined number of source lines is a number of lines less than the number of source lines within either of the two groups. Subsequently, none of the cited references do show or suggest allocating the image signal to the predetermined number of source lines.

Claim 19 recites a liquid crystal display with a switching unit to switch and allocate an image signal from each of the first and second source drivers to a predetermined number of source lines where the predetermined number of source lines is a number of lines less than the number of source lines within either of the two groups. Again, it is this predetermined number of source lines, fed by the source driver, which solves the ease of writing problem for high definition liquid crystal displays. None of the three references cited by the Examiner do teach or suggest this arrangement.

The Examiner's rejection of dependent claims 2-9, 11-18, 20 and 21 is duly noted, however, these claims depend on independent claims 1, 10, and 19, either directly or indirectly, thus including all of the elements of the respective independent claims. In light of the reasons discussed above with respect to claims 1, 10 and 19,

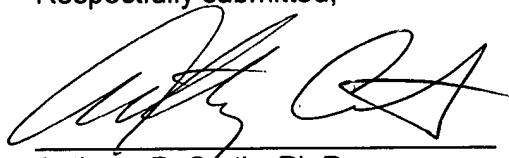
Applicant respectfully requests that the rejection of claims 2-9, 11-18, 20 and 21 be withdrawn.

For the reasons stated above, the references cited by the Examiner do not teach or suggest, either singly or in combination with each other, the arrangements of claims 1, 10 and 19. Thus, claims 1-21 are patentable over the cited references.

Conclusion

In view of the amendments above, Applicant respectfully submits that all of the pending claims are in condition for allowance and seek an early allowance thereof. If for any reason the Examiner is unable to allow the application in the next Office Action and believes that a telephone interview would be helpful to resolve any remaining issues, he is respectfully requested to contact the undersigned attorney or agent.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Anthony P. Curtis', is written over a horizontal line.

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